

What is claimed is:

- 5 1. A method for treating a patient, comprising:  
selecting a patient having an indwelling  
intravascular catheter defining a lumen  
therethrough and having an infection or a  
substantial risk of infection related to the  
presence of the catheter;  
10 infusing a catheter lock solution into the  
lumen, the solution comprising a citrate salt  
solution having a concentration effective to  
eliminate infection and to reduce the likelihood  
of subsequent infection.
- 15 2. The method of claim 1 wherein the lock solution  
comprises a citrate salt in a concentration range, in  
weight percent, of between about 1.5% and about 50%.
- 20 3. The method of claim 2 wherein the lock solution  
comprises a citrate salt in a concentration range, in  
weight percent, of between about 10% and about 40%.
- 25 4. The method of claim 3 wherein the lock solution  
comprises a citrate salt in a concentration range, in  
weight percent, of between about 20% and about 30%.
- 30 5. The method of any of claims 1-4 wherein the lock  
solution includes a viscosifying agent selected from  
polyethylene glycol, glycerin, polygeline and mixtures  
thereof.

6. The method of any of claims 1-5 wherein the lock solution has a pH level between about 4.5 and about 6.5.

5 7. The method of any of claims 1-6 wherein the lumen of the catheter has an internal volume and said infusing includes infusing the lumen with an amount of the lock solution sufficient to fill between about 80% and about 100% of the internal volume of the lumen.

10

8. The method of any of claims 1-7 wherein the catheter has an internal volume and said adding includes injecting the catheter with an amount of the lock solution greater than or equal to about 1.1 times  
15 the internal volume of the lumen.

20

9. A method of inhibiting infections in an animal having an indwelling catheter defining at least one lumen therethrough, said method comprising infusing into the lumen a pharmaceutically acceptable lock solution including a compound having anticoagulant and antibiotic activity, wherein said lock solution has a density and a viscosity sufficient to maintain the lock solution in said lumen for a desired amount of time,  
25 wherein the desired amount of time is at least about 8 hours.

25

10. The method of claim 9 wherein the lock solution includes a citrate salt in a hypertonic concentration  
30 range, in weight percent, of between 1.5% and 50%.

11. The method of claim 10 wherein the lock solution includes a citrate salt in a concentration range, in weight percent, of between 10% and 40%.

5 12. The method of claim 11 wherein the lock solution includes a citrate salt in a concentration range, in weight percent, of between 20% and 30%.

Sub 10 13. The method of any of claims 9-12 wherein the lock solution includes a viscosifying agent selected from polyethylene glycol, glycerin, polygeline or mixtures thereof.

14. The method of any of claims 9-13 wherein the lock solution has a density of between about 1.02 g/ml to about 1.04 g/ml and a viscosity of between about 1.5 cP and about 4.0 cP.

15 15. The method of any of claims 9-14 wherein the lock solution has a density of between about 1.02 g/ml and about 1.03 g/ml a viscosity of between about 1.5 cP and about 2.0 cP.

16. The method of any of claims 9-15 wherein the lumen of the catheter has an internal volume and said infusing includes infusing the lumen with an amount of the lock solution sufficient to fill between about 80% and about 100% of the internal volume of the lumen.

17. The method of any of claims 9-16 wherein the lumen of the catheter has an internal volume and said infusing includes infusing the lumen with an amount of

the lock solution greater than or equal to about 1.1 times the internal volume of the lumen.

18. The method of any of claims 9-17 wherein the lock  
5 solution has a pH level between about 4.5 and about 6.5.

19. A method of treating animals having a surgically  
implanted catheter, said method comprising infusing  
10 into said catheter a pharmaceutically acceptable lock  
solution comprising a bactericidal component, said  
bactericidal component including greater than about  
50%, by weight based on the weight of the bactericidal  
component, of a citrate salt.

20. The method of claim 19 wherein the bactericidal  
component includes greater than about 75%, by weight  
based on the weight of the bactericidal component, of a  
citrate salt.

21. The method of claim 19 or 20 wherein the  
bactericidal component includes greater than about 90%,  
by weight based on the weight of the bactericidal  
component, of a citrate salt.

22. The method of any of claims 19-21 wherein the lock  
solution includes a viscosifying agent.

23. The method of any of claims 19-22 wherein the  
30 pharmaceutically acceptable lock solution has a pH  
between about 4.5 and about 6.5.

24. The method of any of claims 19-23 wherein the lumen of the catheter has an internal volume and said infusing includes infusing the lumen with an amount of the lock solution sufficient to fill between about 80%  
5 and about 100% of the internal volume of the lumen.

25. The method of any of claims 19-24 wherein the lumen of the catheter has an internal volume and said infusing includes infusing the lumen with an amount of  
10 the lock solution greater than or equal to about 1.1 times the internal volume of the lumen.

26. An infusion device for infusing a lock solution into a lumen of a catheter, said device comprising:  
15 a syringe;  
a pharmaceutically acceptable lock solution contained within the syringe, said lock solution comprising a citrate salt;  
wherein said syringe containing the lock solution  
20 is sterilized.

27. The device of claim 26 wherein said lock solution comprising a citrate salt.

28. The device of claim 26 or 27 wherein the lock solution comprises a viscosifying agent selected from polyethylene glycol, glycerin, polygeline and mixtures thereof.

29. The device of any of claims 26-28 wherein the lock solution has a density of between about 1.0 and about 1.5 and a viscosity of between about 1.5 cP and 4.0 cP.

09763666.053501

Sub  
B4

30. A device comprising:  
an intravascular catheter having at least one  
lumen; and  
a pharmaceutically acceptable lock solution  
5 positioned within the lumen, said lock solution  
comprising a citrate salt, wherein said lock solution  
has a pH level below about 6.5.

31. The device of claim 30 wherein said citrate salt  
10 comprises a sodium citrate salt.

Sub  
B5  
32. The device of claim 30 or 31 wherein the lock  
solution has a pH level between about 4.5 and about  
6.5.

15 33. The device of any of claims 30-32 wherein the lock  
solution includes a viscosifying agent selected from  
polyethylene glycol, glycerin, polygeline and mixtures  
thereof.

20 34. The device of any of claims 30-33 wherein the lock  
solution has a density between about 1.0 and about 1.5  
and a viscosity between about 1.5 cP and about 4.0 cP.

25 35. A kit for accessing a patient's intravascular  
system, comprising:

a catheter defining therethrough at least one  
lumen;

a container; and

30 a catheter lock solution contained within the  
container, the solution comprising a citrate salt  
solution and a viscosifying agent dissolved or  
dispersed in the solution.

36. The kit according to claim 35 wherein said container is a syringe.

37. A catheter lock fluid comprising an aqueous  
5 solution of a citrate salt and a viscosifying agent dissolved or dispersed in the solution.

38. The fluid according to claim 37 wherein the  
10 viscosifying agent is selected from the group consisting of polyethylene glycol, glycerin, polygeline and mixtures thereof.

39. A composition comprising an aqueous lock solution including, in weight percent, about 1.5% to about 50% of  
15 a citrate salt, and an amount of a viscosifying agent sufficient provide the lock solution with a viscosity of from about 1.0 cP to about 4.0cP.

40. The composition of claim 39 wherein the lock solution  
20 has a pH level between about 4.5 and about 6.5.

41. The composition of claim 39 or 40 wherein the lock  
25 solution includes, in weigh percent, about 10% to about 40% of the citrate salt.

42. The composition of any of claims 39-41 wherein the citrate salt is trisodium citrate.

43. The composition of any of claims 39-42 comprising  
30 heparin.

09763666-052204  
105250-99959260

Sub  
B6

add